

CLAIMS

What is claimed is:

1. A flexible circuit, comprising:
a substrate having at least one opening;
5 an electrical conductor bonded to a first surface of said substrate;
a first cover layer bonded to said first surface of said substrate and to said
electrical conductor; and
a second cover layer bonded to a second surface of said substrate and to said first
cover layer through said at least one opening.
10
2. The flexible circuit according to Claim 1, wherein said substrate comprises a
polymer.
3. The flexible circuit according to Claim 1, wherein said electrical conductor
15 comprises a metallic conductor.
4. The flexible circuit according to Claim 1, wherein said first and second cover
layers comprise a polymer.
- 20 5. The flexible circuit according to Claim 1, wherein said at least one opening is
located in an environmentally stressed region.
6. A method of fabricating a laminate encapsulated flexible circuit, comprising:
bonding an electrical conductor to a first surface of a substrate;

forming an opening in said substrate;

bonding a first cover layer to said first surface of said substrate; and

bonding a second cover layer to a second surface of said substrate and to said first cover layer through said opening.

5

7. The method according to Claim 6, wherein bonding said electrical conductor to said first surface of a substrate comprises:

depositing a metal film on said first surface of said substrate;

photoengraving said metal film to form a pattern for said electrical conductor; and

10 electroplating said metal film to form said electrical conductor.

8. The method according to Claim 6, wherein bonding said electrical conductor to said first surface of a substrate comprises:

laminating a conductive foil to said first surface of said substrate; and

15 photoengraving said conductive foil to form said electrical conductor.

9. The method according to Claim 6, wherein forming said opening comprises cutting said substrate to form an opening proximate an edge of said flexible circuit in an environmentally stressed region.

20

10. The method according to Claim 6, wherein bonding said first cover layer comprises:

contacting a first film of polymer to said first surface of said substrate; and

curing said first film, wherein said first film bonds to said substrate.

11. The method according to Claim 10, wherein bonding said second cover layer comprises:

contacting a second film of polymer to said second surface of said substrate and to
5 said first cover layer through said opening; and
curing said second film at the same time as said curing said first film, wherein
said second film bonds to said substrate and to said first film through said opening.

12. A method of fabricating flexible circuits, comprising:

10 forming an electrical conductor on a first surface of a substrate of polyimide, for
each flexible circuit;

forming an opening in said substrate, for each flexible circuit;

bonding a first film of polymer to said first surface of said substrate;

bonding a second film polymer to a second surface of said substrate and to said
15 first film through said opening;

patterning first and second films to form a first and second cover layers for each
flexible circuit; and

cutting said substrate outside said patterned first and second cover layers and said
first and second cover layers within said opening, wherein said flexible circuits are
20 singulated.

13. The method according to Claim 12, wherein said forming said electrical
conductor comprises:

depositing a conductive film on said first surface of said substrate; and

photoengraving said conductive film to form a trace.

14. The method according to Claim 13, wherein said photoengraving said
conductive film further forms a contact pad at a first end of said trace and a beam at a
5 second end of said trace.

15. The method according to Claim 13, wherein said conductive film is comprised
of copper.

16. The method according to Claim 13, wherein said opening is located
10 proximate a wicking susceptible region of each flexible circuit.

17. The method according to Claim 13, wherein said opening is located
proximate a de-bonding susceptible region of each flexible circuit.

18. The method according to Claim 13, wherein bonding said first cover layer
15 comprises:

contacting said first film to said first surface of said substrate; and
curing said first film, wherein said first film bonds to said substrate.

19. The method according to Claim 19, wherein bonding said second cover layer
20 comprises:

contacting said second film to said second surface of said substrate and to said
first film through said opening; and

curing said second film, wherein said second film bonds to said substrate and to said first film through said opening.